

CLAIMS

1. An all-optical switch characterized in comprising:
  - a first input port to which a non-return-to-zero light signal is inputted;
  - 5 a second input port to which a carrier light is inputted;
  - first and second light paths;
  - a division unit for dividing the light inputted to said first and second input ports into said first and second
  - 10 light paths;
  - a first nonlinear optical element provided to said first light path, into which one of the light signals among the light signals divided by said division unit and one of the carrier lights among the carrier lights divided by said
  - 15 division unit are inputted, for causing the refractive index to change in nonlinear fashion according to said one light signal, and shifting the phase of said one carrier light in a nonlinear fashion;
  - a second nonlinear optical element provided to said
  - 20 second light path, into which the other light signal among the light signals divided by said division unit and the other carrier light among the carrier lights divided by said division unit are inputted, for causing the refractive index to change in nonlinear fashion according to said other light
  - 25 signal, and shifting the phase of said other carrier light in a nonlinear fashion;
  - an attenuation unit for attenuating said other light signal inputted to said second nonlinear optical element

below said one light signal inputted to said first nonlinear optical element;

a delay unit for causing said other light signal to be inputted to said second nonlinear optical element after said one light signal is inputted to said first nonlinear optical element; and

a synthesizer for synthesizing the light that has passed through said first and second light paths; wherein

the time by which the inputting of said other light signal is delayed by said delay unit is shorter than the relaxation time of the nonlinear refractive index change in said first and second nonlinear optical elements.

2. The all-optical switch according to claim 1, characterized in that said first and second input ports are arranged so that the propagation direction of said light signal is in the opposite direction from the propagation direction of said carrier light.

3. The all-optical switch according to claim 1 or 2, characterized in that said carrier light is unmodulated, continuous light.

4. The all-optical switch according to claim 1 or 2, characterized in that said carrier light is a clock light pulse that is synchronized with said light signal.

5. The all-optical switch according to any one of claims 1 through 4, characterized in that said delay unit is formed by making the length of the light path from said division unit to said second nonlinear optical element in said second light path longer than the length of the light

path from said division unit to said first nonlinear optical element in said first light path.